[Supplementary Information]

Phonon Conduction in Silicon Nanobeam Labyrinths

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Uncertainty Analysis

We quantify the measurement uncertainty using root mean square average for the contribution of each component as following

$$\left.\frac{\Delta k}{k}\right|_{Total} = \sqrt{\left(\left.\frac{\Delta k}{k}\right|_{Var.1}\right)^2 + \left(\left.\frac{\Delta k}{k}\right|_{Var.2}\right)^2 \cdots} \quad \text{(S1)}$$

where k is thermal conductivity and *Var* indicates sources of uncertainty. The error is predominantly attributed to the uncertainty in dimensions of the samples, which is inherently caused by tolerances in nanofabrication and scanning electron microscope (SEM) measurements. We summarize the uncertainty in dimensions and its propagation to thermal conductivity in Table S1. The measurement error caused by uncertainty in system dimensions for all samples is less than ~10% of the thermal conductivity.

Table S1. Uncertainty Analysis

Samples	k ($Wm^{-1}K^{-1}$)	w (±5 nm) Error (%)	s (±5 nm) Error (%)	g (±5 nm) Error (%)	t (±5 nm) Error (%)	Total Error (%)
s = 0 nm	47.2	1.1	-	-	2.4	6.3
s = 95 nm	44.1	0.7	2.5	0.1	2.4	5.5
s = 195 nm	40.0	0.7	5.3	1.8	2.4	7.1
s = 245 nm	39.2	1.2	6.4	3.7	2.4	9.6
s = 295 nm	36.7	0.2	3.9	4.3	2.4	6.7
s = 395 nm	31.8	0.1	3.1	5.0	2.4	8.9